AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) Method of ~~determing~~ determining a digital filter for seismic signals comprising the steps of:
defining ~~contraints~~ constraints representing a filter for preserving signals representing reflection and/or refractions from sub-surface structure and suppressing noise signals in seismic signals; and
using an iterative process with each iteration further comprising the steps of:
- transforming a filter obtained from a previous iteration into a transform domain;
- applying in said transform domain first constraints;
- inverse transforming the filter with the applied constraints into a sample domain; and
- applying in said sample domain second constraints to obtain an iterated filter.

2. (original) The method of claim 1 wherein each step of the iterative process includes the transform of the filter (coefficients) into the wavenumber or frequency-wavenumber domain and the inverse transform back into the spatial or temporal-spatial domain.

3. (original) The method of claim 2 wherein in each step of the iterative process the filter is constrained to a predefined tolerance in the wavenumber or frequency-wavenumber domain.

4. (original) The method of claim 2 wherein in each step of the iterative process the filter is constrained to a predefined response outside a finite region in the spatial or temporal-spatial domain.

5. (original) The method of claim 2 wherein in each step of the iterative process the filter is constrained to a predefined response outside a finite region in the spatial or temporal-spatial domain and in each step of the iterative process the filter is constrained to a predefined tolerance in the wavenumber or frequency-wavenumber domain.

6. (original) The method of claim 1 wherein the filter is obtained by applying alternating projection onto constraints defining convex sets of square summable sequences.

7. (original) The method of claim 1 wherein the transform sampling/periodicity matrix of the transform in Cartesian coordinates is non-diagonal.

8. (original) The method of claim 1, further comprising the step of distributing groups of receivers or single sensor seismic receivers so as to obtain seismic measurements on a staggered or hexagonal grid.

9. (original) The method of claim 8 wherein the step of transforming comprises the use of a spatially staggered or hexagonal transformation.

10. (original) The method of claim 9 wherein the step of transforming the signals comprises the use of a spatially staggered or hexagonal Fourier transformation.

11. (original) The method of claim 1 wherein the filter is a zero-phase finite impulse response (FIR) filter.

12. (original) The method of claim 1 wherein the filter has at least two dimensions.

13. (original) The method of claim 1 wherein the filter is a 3D filter.

14. (new) A filter for seismic data wherein said filter includes constraints representing a filter for preserving signals representing reflection and/or refractions from sub-surface structure and suppressing noise signals in seismic signals; and processor for performing an iterative process with each iteration further comprising the steps of:
- transforming a filter obtained from a previous iteration into a transform domain;
- applying in said transform domain first constraints;
- inverse transforming the filter with the applied constraints into a sample domain; and
- applying in said sample domain second constraints to obtain an iterated filter.

15. (new) A method including the steps of storing seismic data and processing said seismic data using a filter designed using constraints representing a filter for preserving signals representing reflection and/or refractions from sub-surface structure and suppressing noise signals in seismic signals; and processor for performing an iterative process with each iteration further comprising the steps of:
- transforming a filter obtained from a previous iteration into a transform domain;
- applying in said transform domain first constraints;
- inverse transforming the filter with the applied constraints into a sample domain; and
- applying in said sample domain second constraints to obtain an iterated filter.

16. (new) Seismic data processed using a filter designed using constraints representing a filter for preserving signals representing reflection and/or refractions from sub-surface structure and suppressing noise signals in seismic signals; and processor for performing an iterative process with each iteration further comprising the steps of:
- transforming a filter obtained from a previous iteration into a transform domain;
- applying in said transform domain first constraints;
- inverse transforming the filter with the applied constraints into a sample domain; and
- applying in said sample domain second constraints to obtain an iterated filter.

17. (new) A method of representing a subterranean reservoir by use of seismic data processed using a filter designed using constraints representing a filter for preserving signals representing reflection and/or refractions from sub-surface structure and suppressing noise signals in seismic signals; and processor for performing an iterative process with each iteration further comprising the steps of:

- transforming a filter obtained from a previous iteration into a transform domain;
- applying in said transform domain first constraints;
- inverse transforming the filter with the applied constraints into a sample domain; and
- applying in said sample domain second constraints to obtain an iterated filter.